

AGENDA:

1. Project Settings and Custom Templates
2. Materials and Additional Settings

1. Project Settings and Custom Templates

Revit provides a huge array of options for fine-tuning and customizing the appearance and behavior of a project including: project units, annotation styles, fill patterns, line weights, view templates and more.

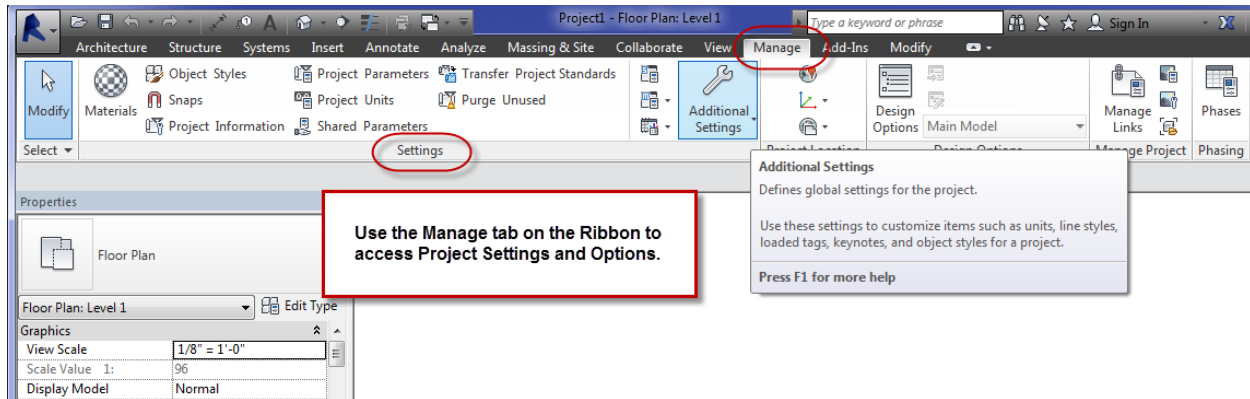
Project Templates provide all of the initial settings for a project and offer an excellent means of reusing information from one project to another. The information and settings that can be saved in a template include **Project Information** such as the organization name, project number, etc., **Project Settings** such as annotation styles and line styles, **Families** such as wall types, stair types, title blocks, etc., **Views** including levels, sections, cameras, etc., **Visibility /Graphic settings** including view-specific overrides, and **Print settings**.

More elaborate templates can include sheets and views which are already placed on those sheets. If you'd like you can even create a template that includes some pre-drawn geometry such as a few walls, a garage, and a typical exterior stair. You can then start a new project and begin to modify the existing geometry rather than drawing it from scratch.

Several Project templates are included with Revit but you can easily make your own template by saving a project with a template file extension, RTE. This option is always available when you have a project open and you use the Saveas command. In the Application Menu's Save flyout, just change Project files to Template files.

A custom Project template can be created by opening an existing template file, modifying settings as required and then use the Saveas command to select the Template file type and give the template a new name. You can start a blank project file with a bare minimum of information preset and then create and load as much information as required from scratch. You can then save the result as a template file.

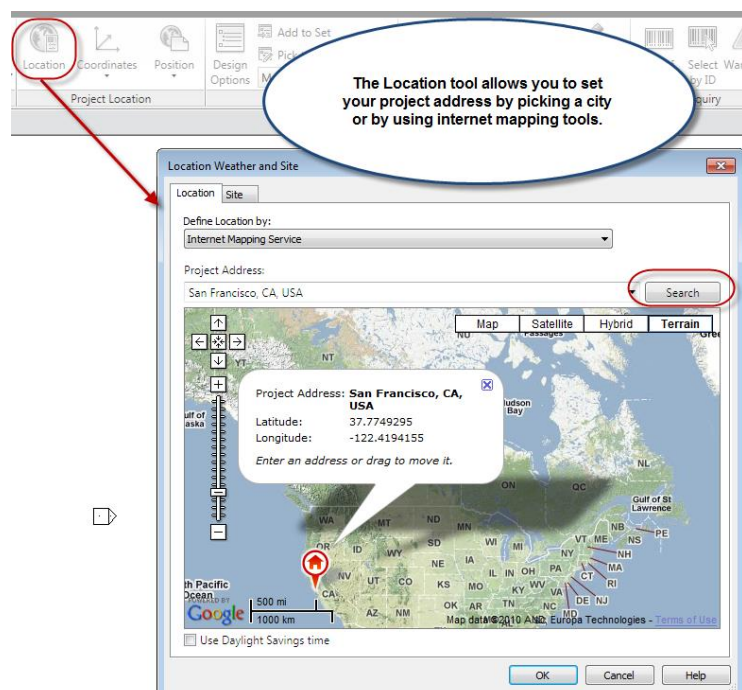
From the Manage tab on the Ribbon, it is possible to access almost all of the crucial options and controls which affect the appearance and behavior of elements within the Revit program.



The Settings panel is divided into three sections: Materials, Object Styles, Snaps, and Project Information are found at the left side, Other Project Settings including Project Units and Transfer Project Standards are in the middle, and Additional Settings provides a dropdown list of an array of other options at the right side.

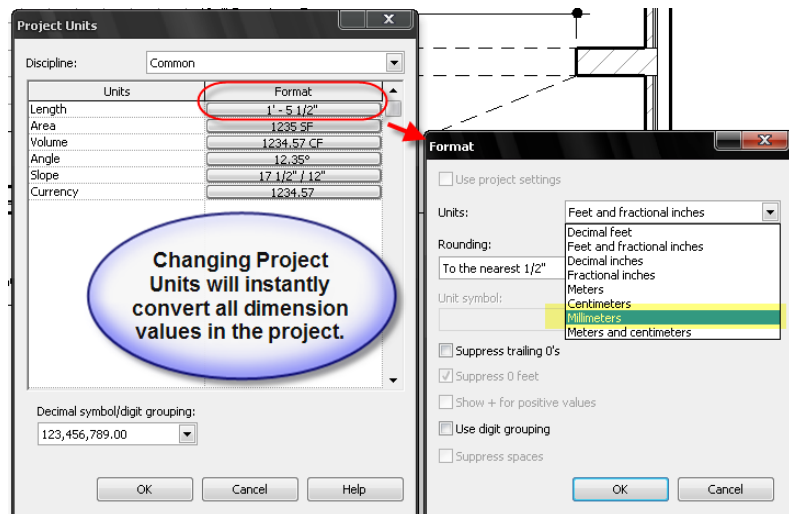
The Project Information Properties allows you to specify the common information which will appear on all of the sheets in the project. This data is saved in a System Family containing parameters for Project Dates, Name, Number, and Address.

The Project Location panel lets you set a geographic orientation with respect to Project North and True North. The Location for the project lets you choose a city or specify an exact set of latitude and longitude coordinates that will define where the project is placed in the World. This information is used to calculate sun angles for Solar and Shadow studies.



Project Units and Snap Settings

Project Unit settings let you control the appearance and formatting of all types of quantities. Here, it is possible to set rounding values and unit types and even switch between units of measurement, instantly converting all of the dimension values in your project from feet and inches to millimeters. (or vice versa)



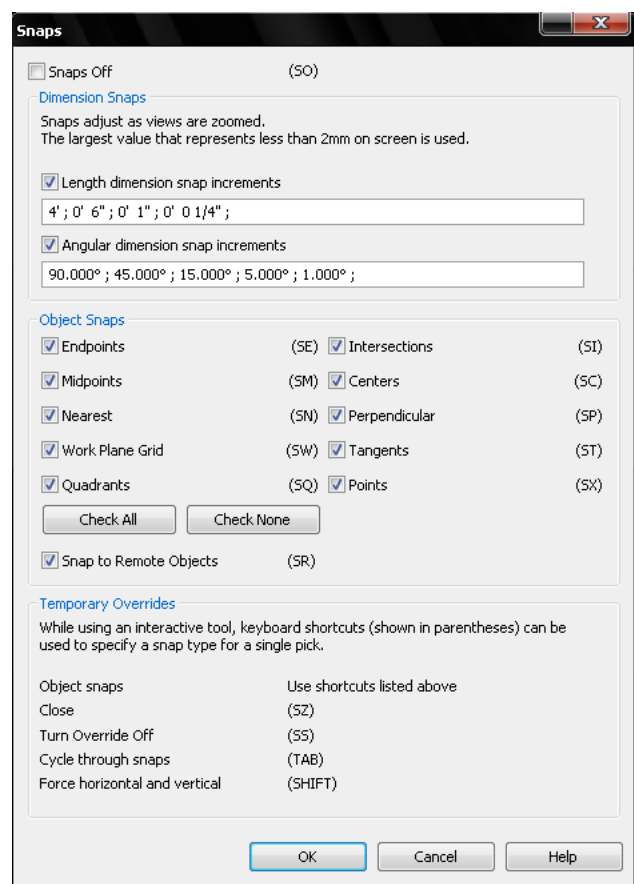
Snap Settings allow you to enable object snaps and set snap increments

Dimension snap increments are used whenever you place an element or move an element in your project. The size of the snap will vary depending on your current zoom level. As you get closer to the object, the snap distances will use smaller values.

Object snaps appear at critical locations on existing elements when sketching, placing elements, or moving objects.

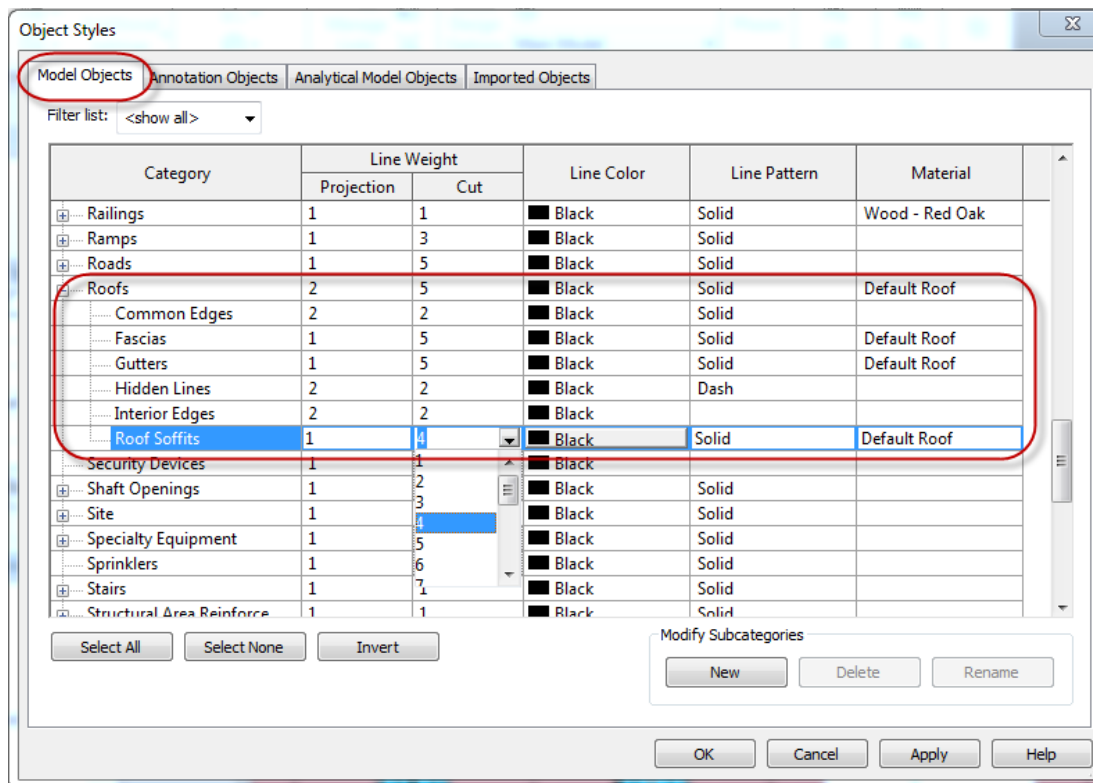
Snap lines are smart alignment features which appear automatically whenever two objects are close to lining up.

Use SZ to close a series of 3 or more segments. Use SHIFT key to force horizontal and vertical alignment for selected points.



Object Styles

Object Styles let you assign line weights, colors, line patterns, and materials to Model objects and imported objects in your project. Different line weights can be assigned to lines in elevation (Projection) and lines in section. (Cut). This allows us to cut a single object like a window frame in a plan view and have the cut frames use a nice heavy line, while the same elements in an elevation view are drawn with a thin line weight.

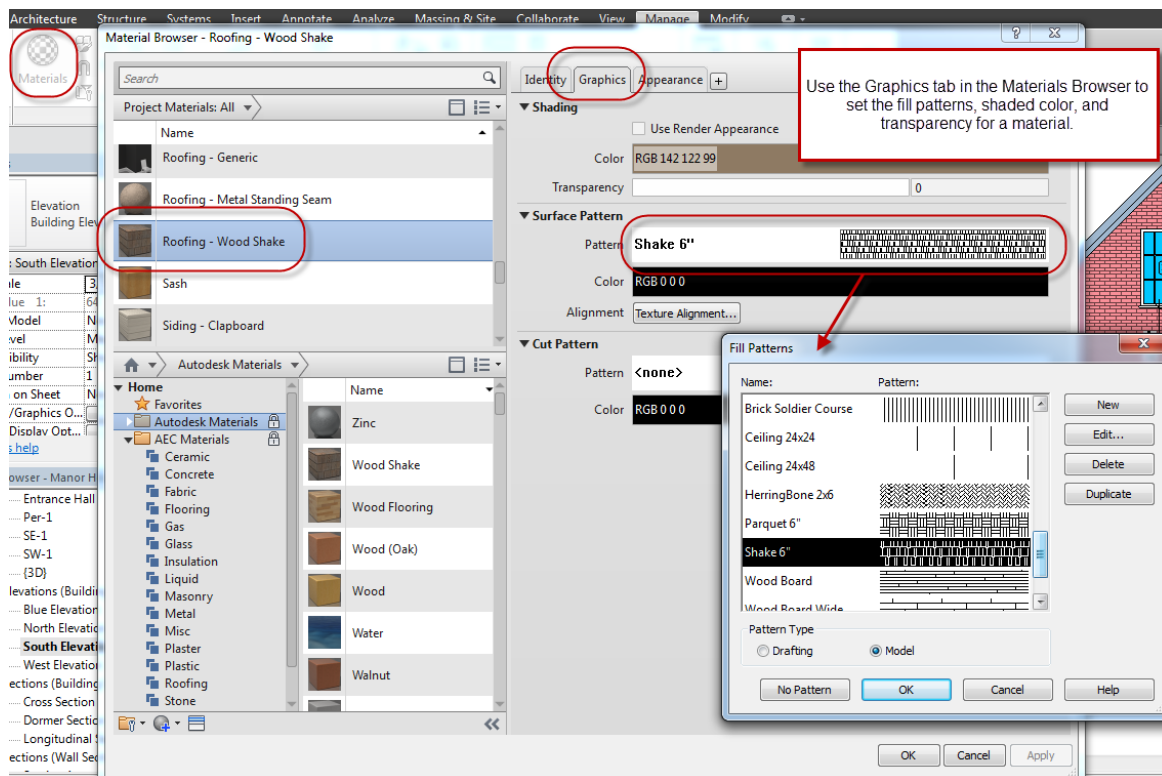


The Annotation Objects tab has one less setting than the model category as annotations always use the Projection type of line weight.

Expand the general categories to display available sub-categories. If you can't find the sub-category you need, perhaps for a custom family, use the New subcategory button to create as many as required and group them under existing top level categories. It is not possible to delete main categories or default subcategories, but custom subcategories can be renamed or deleted.

2. Materials and Additional Settings

Materials are used to define the appearance of all of the various elements that are in our building model. You can use the Materials dialog to find materials to assign to building elements, to modify existing materials appearing on the building, and to define new materials which can be used in the Project.



The Materials Browser can be accessed from the Settings panel or from within material assignment fields for many building elements. The left pane of the dialog lets you filter, organize, and display a list of materials while the right pane displays all of the settings for the currently selected material.

The materials browser lets you filter the list of displayed materials by selecting a Material class such as Fabric, Stucco, or Brick. You can also enter a name in the Search field at the top of the dialog which can be applied to all materials or just a selected class of materials.

Materials can be displayed as text, small thumbnails or large thumbnails.

Materials can define more than just the appearance of a model element in various views. In addition to the color, fill patterns, and transparency settings in the graphics tab, we can also define the rendered appearance settings, assign Identity data such as descriptions, product information, and keynotes. The Physical Tab even lets us define the material properties to use in strength calculations.

Materials are assigned to model elements initially using a category or sub-category in the Object Styles settings. Materials may also be defined in a Family as type parameters or even as instance parameters. In both cases you would be able to see and access the material assignment in the family editor or through the element properties dialog.

If a material is assigned in a family as a type or instance parameter, this material would override the material assigned to that category or sub-category in the Object Styles. If there is no material assigned in the family, the element will use the default defined in Object Styles. Materials may also be assigned to a selected face of a model element by using the Paint tool. This method of explicit face materials will override any other method of material assignment including category settings, type parameters and instance parameters.

To change the model appearance for a material, select that material in the Material browser and open the Graphics tab. In the Shading section choose the color swatch to open a color selector dialog or if appropriate, select the *"Use Render Appearance for Shading"*. If the material is transparent, set a transparency percentage where 0 is perfectly opaque and 100 is perfectly transparent. The Surface pattern section lets you choose a model fill pattern to display in elevation and 3D views while the Cut pattern lets you choose a drafting fill pattern to apply to the object when it is being cut in a plan or section view. Use the color swatches if desired to assign a color other than the default black to use for the patterns.

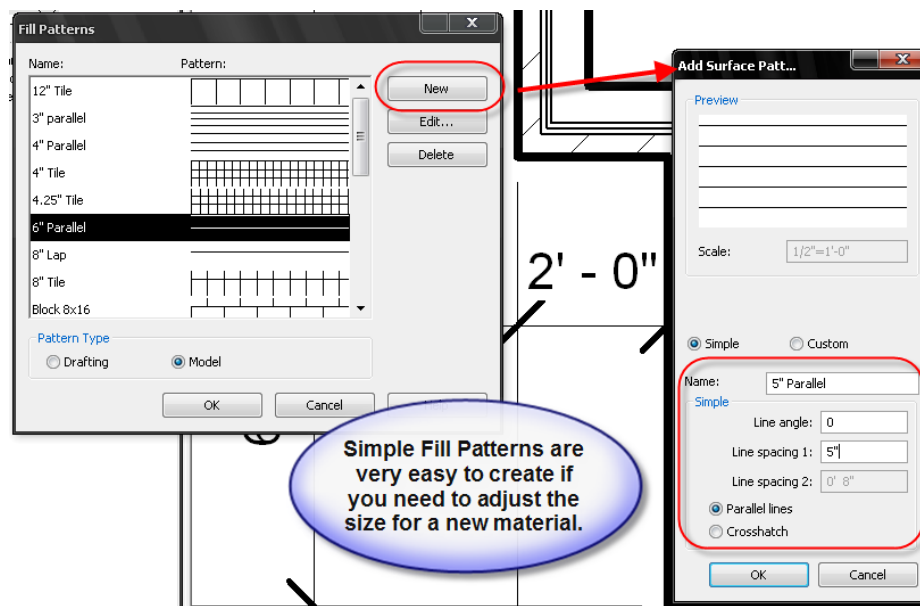
New materials are created by duplicating an existing material in the same class, assigning a name for the new material, and then modifying the properties as required. You can also create a new material from scratch and then define all relevant properties by importing Assets from the Asset Browser.

Materials are stored as part of a project file. You can share materials between projects by using the Transfer Project Standards on the File menu.

Fill Patterns

Fill Patterns allow us to add hatching to surfaces in both sectioned and elevation views to help indicate the material for an element. Revit uses two types of fill patterns: Model Patterns and Drafting Patterns.

Model patterns are used to represent real elements on your building and include things like roof tiles, brick pavers or floor tiles. If you look at a brick wall in a view set to a scale of 1:50, the bricks will look very small, but when you set the scale to 1:10, the size of the bricks, relative to the Sheet on which the view is placed will get much larger. This is the nature of a model pattern. It always stays the same fixed size relative to real world coordinates and will change size only when depicted on a sheet at different scales.

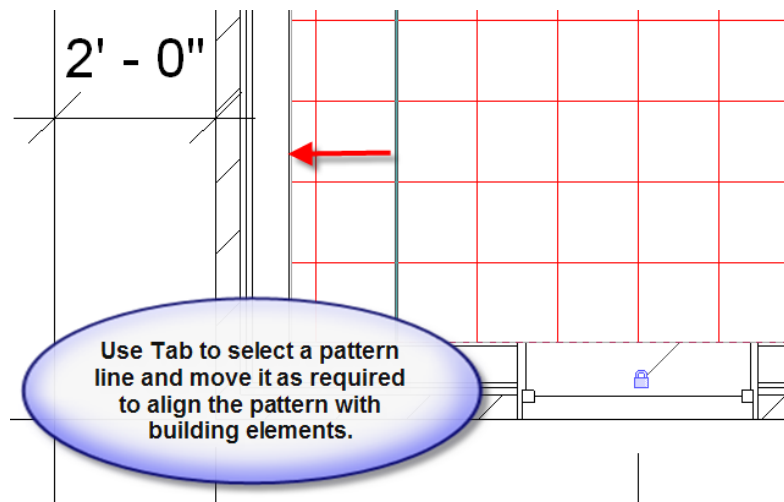


Drafting patterns are symbolic representations of materials and are usually depicted at approximately the same size relative to a drawing sheet. These patterns are used more in section views such as showing a diagonal line for hatching concrete blocks or using mix of triangles and dots to represent poured concrete. A stipple pattern is also used to represent stucco or plaster in elevation views. These types of patterns are always drawn at roughly the same spacing between elements regardless of the scale of the view.

New Fill Patterns may be created by specifying a name, line spacing and line angle for one or two sets of lines. Patterns may be defined as single or double-hatched with the Parallel and Cross Hatch options.

Complex patterns may be defined by choosing the Custom option and importing a Revit pattern file with a .pat extension. Pattern files may be found online or may be created manually by specifying the coordinates and angles to draw the elements in the pattern.

Model hatch patterns may be moved, rotated, dimensioned and aligned to aid in the correct placement and orientation of the pattern.



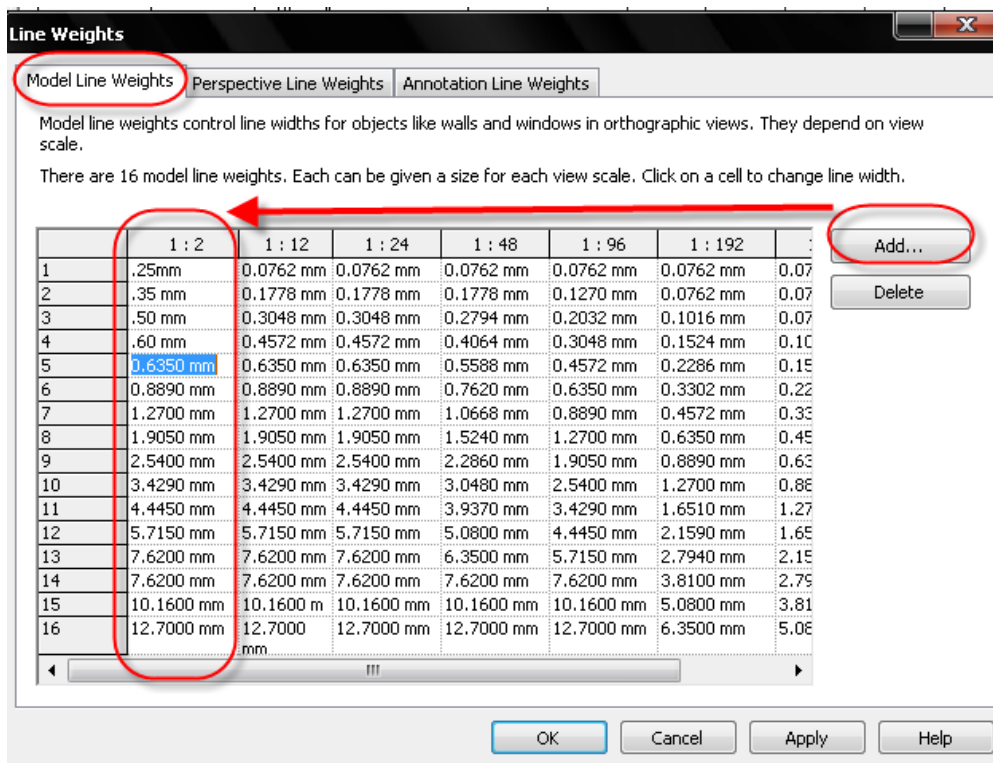
To move a Model pattern, highlight or select the element displaying the pattern and then press Tab to display the closest pattern shape handle and then pick it. You can drag the pattern line or if you use the Move tool you can specify a distance or snap to points.

To quickly move a pattern element to an existing edge, use the Align tool, pick the building edge, and then select the pattern handle. Lock the alignment if desired.

Adding dimensions is a great way to centre a tile pattern in a floor. If you have a 2" strip of tile at one edge of a 12" tile floor, the floor would look better with a 10" strip of tile on each edge. Add a dimension between the edge of the tile and the edge of the wall, pick the floor, set the dimension value to 10" and it will be perfect.

Line Weights

Line weights may be specified for model lines, perspective lines and the lines used in annotations such as dimension or section lines. A line weight, in Revit, is not an explicit width but rather a generic number from 1 to 16 with the higher numbers using wider pen widths. Perspective and Annotation categories use a single line width for each of the 16 line weights.



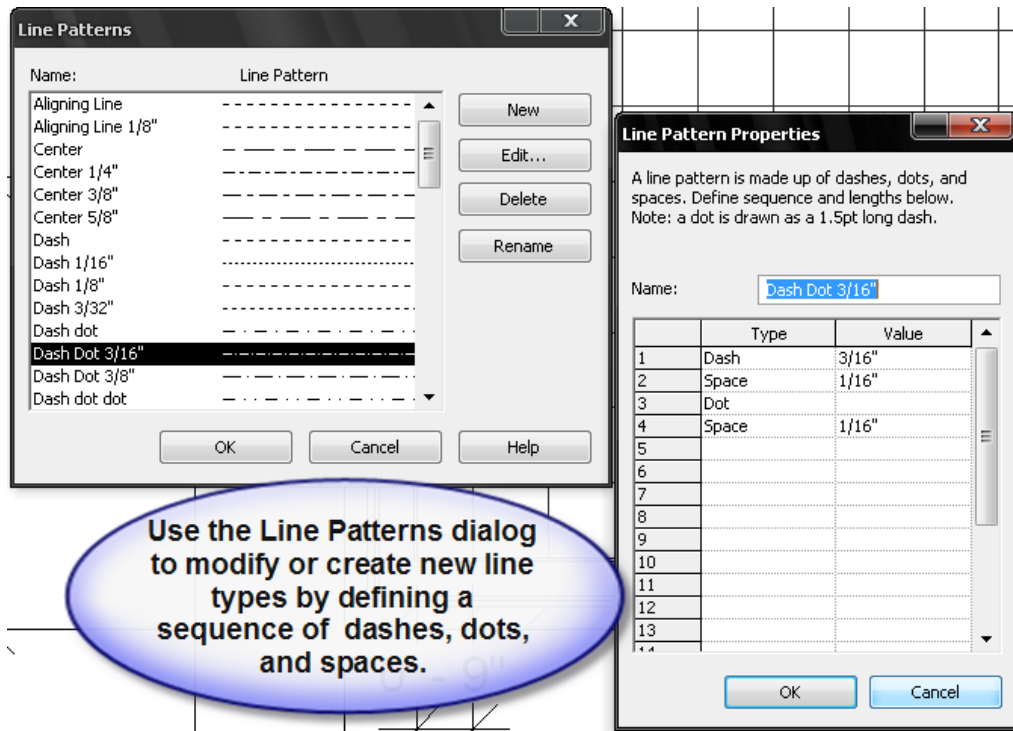
In the Model category however, each of the 16 line weights can vary according to the selected scale.

This is a very clever way of assigning line weights as an object can be depicted with heavier lines automatically as the scale changes. For example a window frame being cut might use a line weight of 4. In a view with the scale set to 1:100, the line width might be .25mm, but at 1:50 the same edge would draw with a .35mm pen and at a scale of 1:10 could be set to draw with a .50mm line width.

It is unlikely you will need to change the line weight settings in Revit as they are designed to work well with the majority of architectural elements. To create a heavier set of lines for larger scale details, use the Add button to create the new scale.

Line Patterns

Line Patterns are another means of conveying information in a drawing. Comprised of a series of dashes, dots, and spaces, with defined sizes, they indicate the location of edges above or below the current level, border line locations, and even the appearance of elements in alternate positions.



Revit includes a wide range of line patterns that are setup to work well in most cases but if you do need to modify the size of a non-continuous line type, use the Edit or New button in the Line Pattern dialog box and you will be able to specify the exact dimensions for all elements within the line pattern.

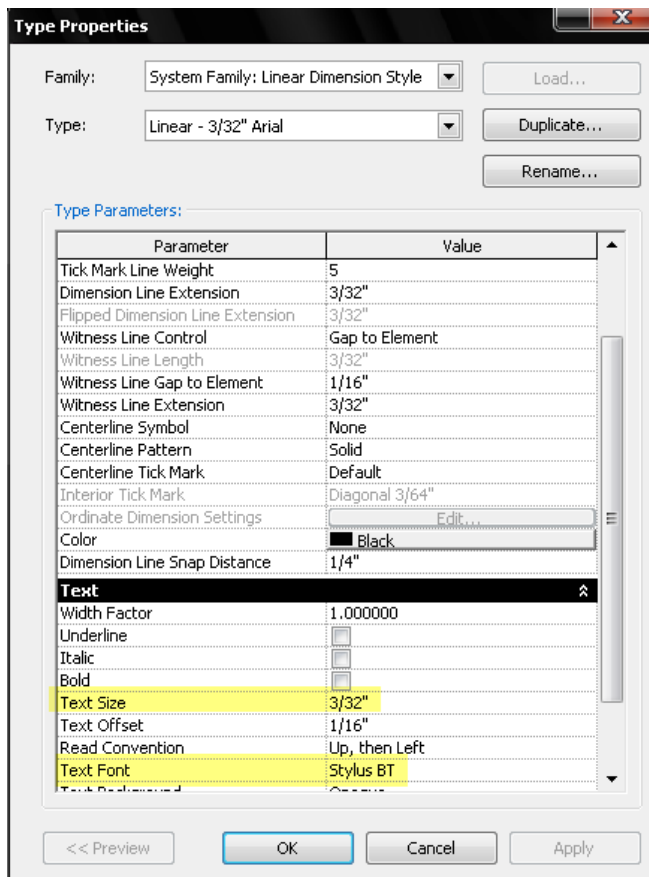
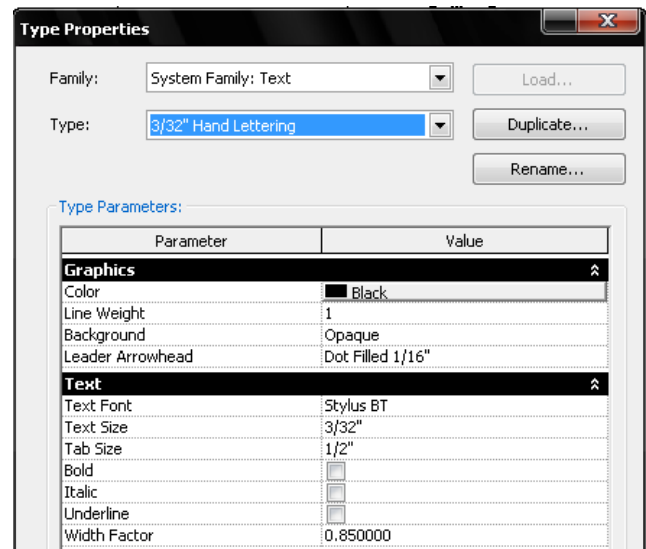
Dots in line patterns are predefined at a certain length and do not require any dimension in the line pattern properties.

The Line Styles dialog allows you to group a set of line properties such as line pattern, line weight, as well as line color and group them with a name such as Medium lines, Thin lines, Wide lines, Hidden lines, etc. The line styles panel appears on the Ribbon whenever you start drawing lines.

Annotation Styles

Annotation Styles allow you to control the appearance of notes, dimension settings and arrowhead styles. In Revit, when you create or modify what you think of as a Style, you are actually modifying a Type in a System Family and it uses a similar dialog to the type properties for a window or a floor.

Annotations, such as notes and leaders will use a Text family type. You can modify the settings of the existing types or create new, custom types with a wide range of options that can be saved in the Type.



An Arrowhead style includes choices for dots, ticks, angled arrows, boxes, etc. and lets you set the size and fill options. After saving the arrowhead style as a new type, you can access it for use with leaders or dimension types.

Dimension types are available for linear, angular, radial, and spot variations. The type parameters include a huge array of settings you can use to fine tune the appearance of your dimensions.

To modify Type Properties or create new types for any type of annotation, start the annotation command and then choose Edit Type from the Properties Palette.

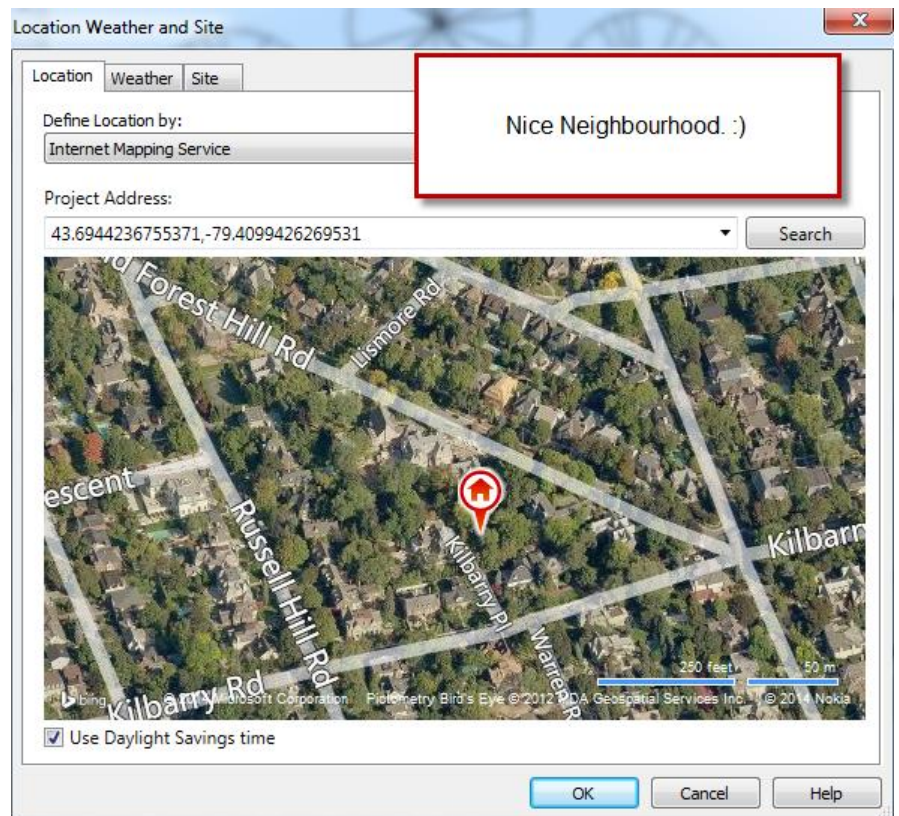
Exercise Notes

In the following exercise you will start a new project with the Default template, modify the project settings, load a few families, create a few levels and then save a new template file. When this is complete you will, save a new project, and begin to layout the building envelope for your final project, Manor House.

3. Start a new project with the default Imperial template. From the Manage tab of the Ribbon, choose Project Information on the Settings panel. Set the following information:

- Issue date- Enter current date
- Project Status - Design
- Client Name - Green Inc.
- Project Name - Manor House
- Project Number - 2015_001

4. From the Project Location panel on the Manage tab, choose Location. In the Location tab, type Toronto in the Project Address field and pick the Search button. Type Kilbarry Pl. in front of the word Toronto and pick Search again. Look in the City pulldown window and find Toronto, ON, Canada. Experiment with the Map options and adjust the zoom level until you can find the empty backyard shown at right. Looks like a nice spot to squeeze in a new house! lol



5. From the Additional Settings pulldown on the Manage tab, choose Fill Patterns. With the Pattern Type set to Model, pick New and define a new, Simple pattern with a line angle of zero, a line spacing of 5", and the Parallel lines option selected. Name the new pattern, 5" Parallel. Pick Ok twice.
6. From the Settings panel on the Manage tab, choose Materials. Set the Material Class to Wood. Pick the Oak Flooring Material and pick the Duplicate Selected Material button in the lower left corner above Properties. Name the new material Wood – Flooring – Wide.
7. With the material selected, in the Graphics tab, Select the color swatch and set a new color. Try RGB values around 200, 110, 55. In the Surface pattern pulldown, select the new 5" Parallel fill pattern you created in the previous step. In the Cut Pattern pulldown, select the Wood 1 pattern. Pick Apply.
8. A material can be defined with three types of Assets – Appearance, Physical, and Thermal. Switch to the Appearance tab and review the material settings. Review the Physical and Thermal Asset tabs and the settings that go into describing this material. Note the big X in the upper corner of the Physical and Thermal assets which allows you to remove these assets if they are not required.
9. Switch back to the Appearance tab and choose the Replace Asset button to open the Asset Browser. Expand the category for Autodesk Physical Assets and Select Wood. View the available wood types defined in this folder. Check the Flooring Category This library has a few Appearance assets but is more important for the Physical and Thermal assets.
10. Expand the Appearance Library heading and select Wood. Review the available materials. These are wood grain materials for furniture. Switch the Flooring category and then the wood subcategory. Review the available wood floors, pick your favourite, and then double-click it to add it to the wood flooring material definition. Close the Asset Browser.
11. Edit the values in the information fields for name and description to Hickory Plank – Cherry Stain. Pick the image swatch for the material to open the texture editor. Change the width value from 3'-0" to 6'-0" to reflect our selection of a wide plank flooring style. Pick Ok and then Ok again to close the material browser.
12. Create a simple, rectangular floor using the default floor type. From the Build panel on the Home tab, pick Floor. Use the lines tool to create a rectangle and then pick Finish Sketch. Type SD to Shade the view.

13. From the Settings menu, choose Object styles. In the Model Objects tab, find the Floors Category and in the Material column, pick Default Floors and then choose the Browser button to open the materials dialog. Set the material class to Wood and select the Wood Flooring Wide material you created in step 4. Pick OK. Pick OK again.
14. Select the floor and in the type selector, change the floor type to the Wood Finish 10" floor type to compare it to your wide plank flooring. Delete the sample floor you created to test your new material.
15. From the Additional Settings dropdown, choose Arrowheads. Duplicate the Diagonal 1/8" arrowhead and create a new type called Diagonal 3/32" with the tick size set to 3/32".
16. From the Quick Access toolbar, choose the aligned dimension tool. On the properties palette, choose Edit Type. Choose Rename and set the name to Linear – 3/32" Stylus. Set Tick Mark to Diagonal 3/32" and in the Text Font section, pick and then type in Sty to select the Stylus BT text font. Set the text height to 3/32" and make it Bold. Set the width factor to .85. Pick Ok.
17. Modify the Angular dimension type as well, renaming the type to Angular Stylus. Set it to use the Angle 90 arrow type, stylus font, and a text height of 3/32". Pick Apply and Ok to close the dialog.
18. From the Annotation tab, pick the diagonal arrow in the lower right corner of the Text panel to open the Text family Type Properties dialog. Duplicate the current type and create a new Annotation text type called 3/32" Stylus. Set the leader arrowhead to Dot Filled 1/16".
19. Add a couple of test walls using a generic 6" wall type. Add an angular dimension between two non-parallel walls and also add a linear dimension showing the width of a single wall.
20. From the Settings panel on the Manage tab, choose Project Units or type UN. Select the format button by Length and choose the suppress 0 feet option. Under Rounding, select "to the nearest 1/2". In the Angle format section choose the Suppress trailing 0's option. Pick Ok twice to close the dialogs and examine the dimensions to see how they have changed. The unit format in the Dimension types is currently set to follow the default Project units. Delete the walls and dimensions.
21. Let's load a few components that we'll need in a typical residential project. From the Insert tab on the Ribbon, choose Load Family. In the Openings Folder, load the Passage Opening-Cased, and the Passage Opening-Elliptical Arch.

22. Open the Load Family dialog again and browse to the Doors category. Select the Single flush and Double flush panel doors and pick Open. Load the types for 30" x 84" and 36" x 84" doors for the single family and 5'-8" x 84" for the double family.
23. Browse to the Doors/ Residential folder. Review the available door families but do not load too many now. We will save a couple of generic families with our template and then we can come back and load more complex families in the actual project file. For now, choose the panel overhead garage door and load it into the file.
24. Continue to Load families. In the Base Cabinets category of the Casework folder, load the the Base Cabinet-Double Door Sink Unit families. Load a countertop with round sink hole.
25. In the Plumbing / Architectural / Fixtures folders, load the Sink Vanity-Round, Toilet-Domestic-3D, Tub-FreeStanding-3D, and Tub-Rectangular-3D.
26. In the Specialty Equipment folder, browse the Domestic category and select some typical kitchen and laundry components such as Refrigerator, Cooking equipment, and laundry appliances.
27. In the Project Browser, right-click over the Sheets category and choose New Sheet. Pick Load and load a copy of the C 17 x 22 Horizontal family. In the new sheet, pick the border of the titleblock, right click and choose Edit Family. Confirm you want to open the file for editing. Delete all of the information above the Client name section in the titleblock. Refer to the drawing handouts and make the new titleblock look the same as the one shown. Use the Saveas command to save the modified titleblock as C 17x22 Horizontal-Custom. Choose Load into Projects and then select the project file you have been working on.
28. Switch to Level 1 and set the scale to 3/16" = 1'-0". Switch to Level 2 and do the same. Switch to the South elevation and zoom in on the Level labels. Rename Level 1 to 1_First Floor. Rename Level two to 2_Second Floor. Confirm that you want to rename the views.

29. Add 6 more levels. Set the names and elevations as shown below from top to bottom.

- | | | |
|--------------------|----------|--------------------------|
| • Top of Plate 2 | 19'-1 ½" | (no plan views required) |
| • 2_Second Floor | 10'-1 ½" | (plan view required) |
| • Top of Plate 1 | 9'-0" | (no plan views required) |
| • 1_First Floor | 0'-0" | (plan view required) |
| • Top of Fndn | -1'-2" | (no plan view required) |
| • Grade | -1'-10" | (plan view required) |
| • 0_Basement Floor | -9'-2" | (plan view required) |
| • T.O. Ftg. | -9'-6" | (no plan view required) |

30. After creating the new levels, add elbows where required and align the ends of the level lines. In the project Browser, delete any extra ceiling plan views. We will only require ceiling plans for the main levels – Basement, First Floor, and Second Floor.

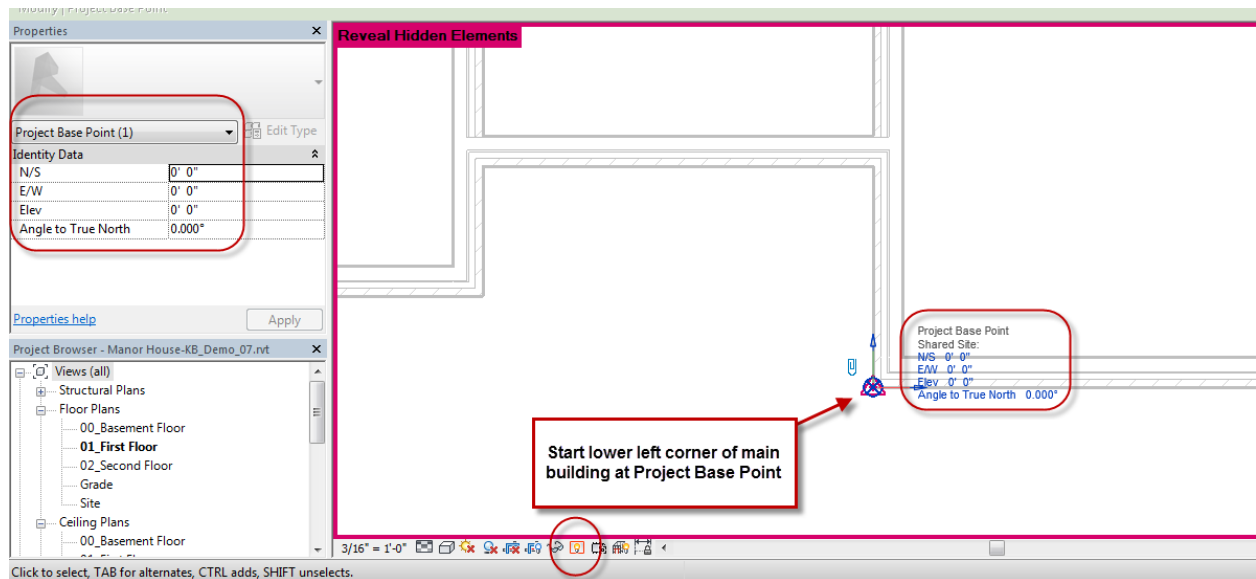
31. Switch to 01First Floor Level. From the file menu, choose Saveas and in the Save file dialog, change the files of type to Template files. Name the file Revit Residential and save it in your project folder. Close the file.

32. From the Recent files menu, choose to start a new project and then browse to your new template file. Pick open and Ok to start a new, unnamed project from your custom template. Save it again with a project file type and call the file Manor House_xx where xx will be your initials. (for example, My file is called Manor House_KB for Kevin Brown.)

33. Refer to the Handout sheet, A-1 Floor Plan and draw the exterior walls with the wall type set to Basic Wall: Exterior – Brick on Mtl Stud. We will modify and rename this wall type to a wood frame style of construction in the next class, but for now, it will be fairly close to the size and structure that we require.

34. There two distinct sections to the Project. On the right hand side the majority of the building is two storeys and the walls you use should be set with their Top Constraint set to 2nd Floor Clg. On the left side of the plan is a garage connected to the House by a covered passageway called a Porte Cochere. The walls for the garage will be set with a top constraint at the 2_Second Floor level. Draw all walls with the Location Line set to Finish Face: Exterior.

35. Draw all of the exterior walls for both sections at the First Floor level. We will adjust the tops and bottoms of the walls with offsets and extensions in the next class.
36. Start the first exterior wall so that the lower left corner of the main building aligns with the Project Base Point. Use Reveal Hidden elements toggle to display the Base Point.



37. The angled bay window in the front elevation will be created separately in another class and for now, you can simply draw the main exterior wall type straight across in this section.
38. Add the windows and exterior doors to the exterior walls, creating dimensions to position the openings and begin the documentation process.
39. When all of the exterior walls are in place, save your project, back up your files for safekeeping and close the program. We will continue with this project in the next class.

